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UNITED STATES DISTRICT COURT  
DISTRICT OF OREGON  
PORTLAND DIVISION

suffering from asthma, my first thought was, “this is going to kill people.” It was unsurprising to find out that someone has already died acutely after exposure to pepper spray.<sup>1</sup> I, along with other physicians and public health experts, worry there will be more, both directly from tear gas exposure, and due to the use of this substance in the middle of a COVID19 pandemic.

3. Tear gas (a name for a collection of compounds designed to induce pain through severe irritant means, whether in the eyes, skin or lungs, often o-chlorobenzylidene aka “CS”) has been studied by our own military.<sup>2</sup> This showed that in military recruits, who are generally young and healthy, exposure to CS more than doubles the rate of pneumonia, bronchitis and viral illness following exposure. People die from each of these diseases every day, and are of particular concern during a COVID19 pandemic. This suggests likely significant airway damage in healthy lungs, since this is data for young healthy military recruits in basic training. We know that those protesting for civil rights also include the elderly, children and medically vulnerable, therefore the rates of those affected and sickened will be higher. We certainly also have police officers serving who have chronic medical conditions including asthma and COPD. A 2016 re-evaluation<sup>3</sup> of what is known about these “tear gas” agents noted that studies regarding safety of these chemicals focused on animal models and

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<sup>1</sup> Stephen Rex Brown et al., *Inmate dies of heart attack after being pepper sprayed at Brooklyn federal jail: source*, NY Daily News (June 3, 2020), available at: <https://www.nydailynews.com/new-york/ny-mdc-inmate-heart-attack-20200604-rrvzzt23tjc4th5shyecsndzmpi-story.html>.

<sup>2</sup> Joseph J. Hout, MS USA, Duvel W. White, MS USA, Anthony R. Artino, MSC USN, Joseph J. Knapik, ScD, *o-Chlorobenzylidene Malononitrile (CS Riot Control Agent) Associated Acute Respiratory Illnesses in a U.S. Army Basic Combat Training Cohort*, *Military Medicine*, Volume 179, Issue 7, July 2014, Pages 793–798, available at: <https://academic.oup.com/milmed/article/179/7/793/4259353#101149356>.

<sup>3</sup> Craig Rothenberg, Satyanarayana Achanta, Erik R. Svendsen, Sven-Eric Jordt, *Tear gas: an epidemiological and mechanistic reassessment*, *Ann N Y Acad Sci.* 2016 Aug; 1378(1): 96–107. Published online 2016 Jul 8, available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5096012>.

young healthy military recruits, which makes sense as these were initially weapons of war (though now banned under the Geneva conventions). Releasing this chemical on a general population cannot be characterized as a “non-lethal” intervention at the population level. There are surely people who will die from this tool if deployed in large numbers.

4. Asthma affects around 11% of the population in Oregon, and tear gas can be a lethal cause of bronchospasm, provoking severe respiratory distress and potential sudden respiratory collapse in people with asthma. Indiscriminately firing tear gas into a crowd will have the risk of killing people, and it must be considered as an intervention with the potential for lethal effect.
5. When we study medications to determine their safety in people, we look at them in large populations over time and document the comorbidities of those exposed to the substance. Declaring a substance “safe” in the absence of these studies is likely an error, and does not pass the plausibility test if the population exposed includes those with underlying airway disease, particularly for substances known to cause actual burn injury on the skin.<sup>4</sup> This has been the conclusion of others reviewing the literature as well. Like anything in medicine, we have to think not only about the active ingredient of the substance, but also what it is “mixed” in.
6. Tear gas is not actually a gas but solids deployed in liquid form either from a pressurized dispenser as a spray or aerosolized via mixture of a powdered chemical form with a pyrotechnic mixture. That 2016 re-evaluation found concerns for

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<sup>4</sup> Zekri, A.M. , King W.W., Yeung R., et al 1995. Acute mass burns caused by o-chlorobenzylidene malononitrile (CS) tear gas. Burns 21: 586–589, available at: <https://www.sciencedirect.com/science/article/abs/pii/030541799500063H>.

- significant toxicity with these mixtures. For example, CS is generally only 45% of the mixture, with the rest including chemicals like maleic anhydride, epoxy resin, etc and generally aerosolizes in 3 to 10um microparticles. Sprays are often dispersed in methyl isobutyl ketone (hexone), which is another potentially hazardous compound.
7. In conjunction with the current circulating COVID19 pandemic, firing a substance that is going to force people to remove their masks, cough forcefully, and touch their eyes, and be more susceptible to viral infection, is certainly going to lead to worsened spread of the pandemic, even if those who are symptomatic stay home since we know there is asymptomatic carriage of COVID19. Pepper spray, like viruses, does not discriminate. It can affect protestors, bystanders and the police themselves. Every life is precious, and exacerbating a pandemic is not a responsible response to peaceful protest.
  8. Though it is frequently lost in the discussion, we have to talk about the healthcare expenditures with unhealthy air. I have treated countless patients with asthma in the ICU and clinic and am now treating patients with COVID19. This is a severe and devastating virus resulting in prolonged ICU stays and hospitalizations. The US spends over 16 billion dollars per year in asthma care, and we are going to spend untold billions on COVID19. Spreading additional COVID19 cases will lead not only to high healthcare expenditures, for which we all pay in either premium dollars or taxes to support Medicare or Medicaid, but also the economic instability accompanying the loss of breadwinners and caregivers for families.
  9. I work in a life-and-death field. I know the sinking feeling when we are starting to lose a patient as well as the surge of adrenaline that occurs in these situations with

lives at risk, and we are trained to think clearly in these situations. I have also worked with patients that have been violent or verbally abusive towards me and other staff. We train very carefully in how to de-escalate and control these situations, and have precise ethical steps we are empowered to take depending on the situation. We always weigh the risks and benefits of each intervention along with patient and staff safety. When I am working with patients in the clinic with high deductibles and the “donut hole,” we also think about the costs of each medication vs its benefit to their lives. Tear gas is a “high cost” substance in both human health and downstream healthcare expenditures to treat those suffering from its exposure. It is time for careful reflection on the true risks and benefits of tear gas, particularly in this situation with a circulating pandemic.

10. I cannot imagine it is worth the human or healthcare costs to be using tear gas in such volumes.

Executed on June 9, 2020.



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Erika Moseson (Jun 9, 2020 12:40 PDT)

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**PULMONARY & CRITICAL CARE PHYSICIAN**

I currently work at Legacy Health in Portland, OR as a pulmonary and critical care physician. I have previous work experience as a hospitalist caring for advanced heart failure patients and bone marrow transplant patients. I enjoy the care of lung cancer patients in multi-disciplinary settings and spent time during fellowship researching efficient and cost-effective ways of tracking patients with high-risk pulmonary imaging findings. I enjoy the care of medically complex patients both as the primary physician in addition to in consulting and co-management roles. I have training in systems improvement and patient safety. I am passionate about public health and clean air in disease prevention as well as equitable access to medical care.

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**DIVERSE INTERESTS**

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|---------------------------------|---------------------|---------------------------------|
| ▪ Thoracic Oncology             | ▪ Quality & Safety  | ▪ Palliative Care & Ethics      |
| ▪ Critical Care                 | ▪ Tobacco Cessation | ▪ Clean Air Policy              |
| ▪ Social Determinants of Health | ▪ Patient education | ▪ Multi-disciplinary approaches |
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**LEGACY MEDICAL GROUP-**

Portland, Gresham, Tualatin, OR Sept 2015 - Pres

**Pulmonary & Critical Care Medicine Physician-**

- Practicing critical care and pulmonary medicine- both urban hospital downtown and suburban sites
- Pulmonary Section Chair- Emanuel hospital
- Quality Chair- Legacy Pulmonary Medicine – 2016 - 2017
- Working to improve ARDS protocols with Respiratory Therapy department, ARDSnet protocol card on every ventilator, put on ARDS city-wide symposium

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**EDUCATION & TRAINING****OREGON HEALTH & SCIENCE UNIVERSITY**

Portland, OR

2012-2015

**Pulmonary & Critical Care Medicine Fellow**

- Training at tertiary academic medical center as well as large VA hospital
- Pursuing health systems research evaluating programs for surveillance of lung nodules
- Obtaining procedural proficiency in: flexible bronchoscopy, endobronchial ultrasound, electromagnetic navigational bronchoscopy, pleural drainage management, and critical care procedures
- General pulmonary continuity clinics at VA hospital and university hospital in addition to sub-specialty clinics in lung cancer and pulmonary hypertension

**Certificate in Human Investigations**

2013-2015

- 2 year longitudinal curriculum in designing clinical research, epidemiology, biostatistics, and project management, honing skills useful for meaningful quality improvement and maintenance

**UNIVERSITY OF CALIFORNIA SAN FRANCISCO**

San Francisco, CA

2008-2011

**Internal Medicine Residency**

- Training sites: Urban safety net hospital and Level One trauma center (San Francisco General Hospital), academic quaternary care center (UCSF), and San Francisco VA Medical Center

- Pathway in Health & Society: Health Policy & Leadership Track** 2009-2011
- Completed two year curriculum in leadership skills, quality, safety & health policy
- CORNELL UNIVERSITY- WEILL MEDICAL COLLEGE** New York, NY 2004-2008
- MD 2008, member of Alpha Omega Alpha honors society
- STANFORD UNIVERSITY** Stanford, CA 1998-2003
- BA, MA 2003, graduated Phi Beta Kappa
  - 6 month anti-tobacco public health internship in Florence, Italy

#### PRIOR PROFESSIONAL EXPERIENCE

UNIVERSITY OF CALIFORNIA SAN FRANCISCO San Francisco, CA July 2011-June 2012

##### **Hospitalist**

- Hospitalist on multi-disciplinary team caring for patients with advanced heart failure, pulmonary hypertension, LVADs, and pre- and post- heart transplant
- Hospitalist on bone marrow transplant service with patients admitted for routine chemotherapy, auto- and allo- stem cell transplant, neutropenia, GVHD and other complications of malignancy
- Nocturnist covering general medical wards, as well as transplant services and teaching housestaff

#### QUALITY IMPROVEMENT & PATIENT SAFETY

- LMG Critical Care- ARDS Protocol Vent Cards/Order Sets** Portland, OR 2017-Pres
- LMG Pulmonary – Quality Improvement Committee** Portland, OR 2016-2017
- American Thoracic Society- Patient Information Series** Portland, OR 2014
- Helped develop patient education material on COPD Exacerbations, published in *AJRCCM* 2014
- Agency for Healthcare Research and Quality-** San Francisco, CA 2012
- Analysis of evidence for prevention of contrast-induced nephropathy for *Making Healthcare Safer II*, chapter co-author
- UCSF Emergency Department “Door to floor” improvement** San Francisco, CA 2010- 2011
- Worked on improving UCSF Emergency Department wait times and shortening evaluation time in ED, including innovations in staffing (e.g. “triage hospitalist”)
- Pacific Business Group on Health- Physician Value Partnership** San Francisco, CA 2009-2010
- Consultation project in developing physician partnerships for high-value healthcare delivery
- Quality Improvement Project- San Francisco General Hospital** San Francisco, CA 2009-2010
- Patient safety checklist initiative on cardiology service, increased VTE prophylaxis rates

#### PROFESSIONAL QUALIFICATIONS

**State Medical Licenses:** Oregon (current) and California (former)

**Board Certifications:** Internal Medicine (2011), Pulmonary (2014), Critical Care (2016)

##### **Oregon Thoracic Society-**

- Secretary 2014-2016
- President-elect- 2017-present
- Advocacy Champion- 2017- present- working with American Lung Association advocating for cleaner air in Oregon, from tobacco to diesel exhaust to air toxics. Submitting written and oral testimony at local, state, and national government level

**MA in Religious Studies:** research on perspectives on body and illness in religion, interested in ethics,



palliative care and end-of-life issues

#### Awards & Honors:

- Oregon Society of Critical Care Symposium Research Award 2012
- Northern California American College of Physicians Resident Research Award 2010
- Sarah O’Laughlin Foley Prize in Clinical Medicine, 2008
- Janet M. Glasgow-Rubin Memorial Achievement Citation, 2008
- Joan M. May Fellow Award- 2 months medical training in Australia, 2008

**Procedural training:** central line placement, arterial line placement, paracentesis, thoracentesis, lumbar puncture, flexible fiberoptic bronchoscopy, endobronchial ultrasound (EBUS), electromagnetic navigational bronchoscopy (ENB), endotracheal intubation, pleural drainage systems

#### ACADEMICS AND SCHOLARSHIP

#### Research Mentors:

**Dr. Christopher Slatore- OHSU Pulmonary & Critical Care** Portland, OR  
2013-2015 Health Systems Research- evaluating lung nodule protocols

**Dr. Carolyn Calfee – UCSF Pulmonary & Critical Care** San Francisco, CA  
2010-2011 Clinical research – evaluating performance of ICU and ED scoring systems

**Dr. Paul La Rosée - III. Medizinische Klinik- University of Heidelberg** Mannheim, Germany  
2004 Bench research in chronic myeloid leukemia

**Dr. Brian J. Druker - Oregon Health Sciences University/HHMI** Portland, OR  
2000, 2001, 2003 Bench research in chronic myeloid leukemia and imatinib mesylate (Gleevec)

#### Publications:

**Moseson EM**, Wiener RS, Golden SE, Au DH, Gorman JD, Laing AD, Deffebach ME, Slatore CG. Patient and Clinician Characteristics Associated with Adherence. A Cohort Study of Veterans with Incidental Pulmonary Nodules. *Ann Am Thorac Soc*. 2016 May;13(5):651-9.

Weiss CH, Krishnan JA, Au DH, Bender BG, Carson SS, Cattamanchi A, Cloutier MM, Cooke CR, Erickson K, George M, Gerald JK, Gerald LB, Goss CH, Gould MK, Hyzy R, Kahn JM, Mittman BS, **Moseson EM**, Mularski RA, Parthasarathy S, Patel SR, Rand CS, Redeker NS, Reiss TF, Riekert KA, Rubenfeld GD, Tate JA, Wilson KC, Thomson CC. “An Official American Thoracic Society Research Statement: Implementation Science in Pulmonary, Critical Care, and Sleep Medicine.” *Am J Respir Crit Care Med*. 2016 Oct 15;194(8):1015-1025.

Lareau S, **Moseson E**, Slatore CG. “Exacerbation of COPD.” *Am J Respir Crit Care Med*. 2014 Mar 15;189(6):P11-2

**Moseson EM**, Zhuo H, Chu J, Stein JC, Matthay M, Kangelaris K, Liu KK, Calfee CS. “Intensive care unit scoring systems outperform emergency department scoring systems for mortality prediction in critically ill patients: a prospective cohort study.” *Journal of Intensive Care* 2014 Jul: 2(40).

Ranji SR, Rennke S, Magan Y, **Moseson EM**, Wachter RM. Chapter 23: Interventions to prevent contrast-induced acute kidney injury. In: Shekelle PG, Wachter RM, Pronovost PJ et al. Making Health Care Safer II: An Updated Critical Analysis of the Evidence for Patient Safety Practices. Comparative Effectiveness Review No. 211. (Prepared by the Southern California-RAND Evidence-based Practice Center under Contract No. 290-2007-10062-I.) AHRQ Publication No. 13-E001-EF. Rockville, MD: Agency for Healthcare Research and Quality. March 2013

Griswold IJ, MacPartlin M, Bumm T, Goss VL, O'Hare T, Lee KA, Corbin AS, Stoffregen EP, Smith C, Johnson K, **Moseson EM**, Wood LJ, Polakiewicz RD, Druker BJ, Deininger MW. "Kinase domain mutant of Bcr-Abl exhibit altered transformation potency, kinase activity, and substrate utilization, irrespective of sensitivity to imatinib." *Molecular and Cellular Biology*. 2006 Aug; 26(16): 6082-6093.

La Rosée P, Johnson K, Corbin AS, Stoffregen EP, **Moseson EM**, Willis S, Mauro MM, Melo JV, Deininger MW, Druker BJ. "In vitro efficacy of combined treatment depends on the underlying mechanism of resistance in imatinib-resistant Bcr-Abl positive cell lines." *Blood*. 2004 Jan; 103(1): 208-215.

O'Hare T, Pollock R, Stoffregen EP, Keats JA, Abdullah OM, **Moseson EM**, Rivera VM, Tang H, Metcalf CA 3rd, Bohacek RS, Wang Y, Sundaramoorthi R, Shakespeare WC, Dalgarno D, Clackson T, Sawyer TK, Deininger MW, Druker BJ. "Inhibition of wild-type and mutant Bcr-Abl by AP23464, a potent ATP-based oncogenic protein kinase inhibitor: implications for CML." *Blood*. 2004 Oct; 104(8): 2532-2539.

### Posters/ Oral presentations:

**Moseson E**, Golden S, Slatore C. "Adherence to Fleischner Society Guidelines among Veterans with Pulmonary Nodules in a Clinical Registry." American Thoracic Society, San Diego, CA 201

**Moseson, E**, Nichols, D. "The Clinical Roller Coaster: Severe Serotonin Syndrome." Society of Critical Care Medicine, San Francisco, CA Jan 2014.

**Moseson E**, Zhuo H, Stein J, Chu, J, Matthay M, Kangelaris K, Liu K, Calfee C. "Prognostic value of pre-hospital critical illness score compared to emergency department and intensive care unit scoring systems." SCCM San Juan, Puerto Rico, Jan 2013

**Moseson E**, Zhuo H, Stein J, Chu, J, Matthay M, Kangelaris K, Liu K, Calfee C. "Comparison of intensive care unit and emergency department based scoring systems for prediction of mortality in critically ill patients." American Thoracic Society. San Francisco, CA 2012.

Quinn GR, Soni K, Berger G, Berkowitz S, Brenner S, Chang JT, Gleason N, Le E, Mak E, **Moseson E**, Tello J, Vidyarthi A, and Pierce R. Quality Improvement in the Admissions Process. Institute for Healthcare Improvement National Meeting - December 2011, Orlando, FL. *WINNER – PERMANENTE JOURNAL*

Quinn GR, Soni K, Berger G, Berkowitz S, Brenner S, Chang JT, Gleason N, Le E, Mak E, **Moseson E**, Tello J, Vidyarthi A, and Pierce R. Door-to-Floor: Resident-Led Quality Improvement in ED Flow. UCSF Pathways & Rector Symposia – May & June 2011, San Francisco, CA.

Quinn GR, Soni K, Berger G, Berkowitz S, Brenner S, Chang JT, Gleason N, Le E, Mak E, **Moseson E**, Tello J, Vidyarthi A, and Pierce R. ED Door-to-Floor: Quality Improvement in the Admissions Process. UCSF Quality and Safety Innovation Challenge May 2011, San Francisco, CA.

**Moseson** and Huen. "Quality and safety checklist on high-turnover resident service improves rates of VTE prophylaxis." *WINNER NORTHERN CA ACP RESIDENT RESEARCH AWARD*

**Moseson**, Berkowitz, Brenner, Chang, Gleason, Soni, Pierce and Vidyarthi. "Targeting the most expensive 15 minutes: Key cost drivers in physician workflow and purchaser-side solutions." Institute for Healthcare Improvement 2010, Orlando, FL

Chang, Berkowitz, Brenner, Gleason, Soni, **Moseson**, Pierce and Vidyarthi. "Incentivizing The Virtuous Spiral of Value: Using Novel Targeted Investments in Infrastructure to Enhance Primary Care. American College of Physicians Meeting, San Francisco, CA 2010

**Moseson**, Huen. "Go with the workflow: a team-based quality checklist for the SFGH Cardiology service." Safety Net Institute Summit on Quality Improvement. San Francisco, CA. June 2010.

**Moseson**, Han, Greene. "Baby takes a bite: toxic shock syndrome from mastitis." Society for Hospital Medicine National Conference. Washington DC April 2010.

Simmons, Martins, Christos, **Moseson**, Pilavas, Colantino, Cataldi, Shafee. "Analysis of False Negative Results with Frozen Section of Sentinel Lymph Node Biopsy for Breast Cancer." Society of Surgical Oncology Annual Meeting. Washington, DC. March 2007.

Koenig, **Moseson**, Lorentz, Paschka, Melo, Hehlmann, Hochhaus, La Rosée. "Glutathione-Depletion Potently Enhances the Cytotoxic Activity of Arsenic Trioxide in Imatinib Sensitive and Resistant Bcr-Abl Positive Cell Lines." American Society of Hematology Conference. San Diego, CA. December 2004.

Griswold, Bumm, O'Hare, **Moseson**, Druker, Deininger. "Investigation of the Biological Differences

between Bcr-Abl Kinase Mutations Resistant to Imatinib.” American Society of Hematology Conference. San Diego, CA. December 2004. [Oral Presentation by Dr. Griswold]  
La Rosée, Johnson, **Moseson**, O'Dwyer, Druker. “Preclinical Evaluation of the Efficacy of STI571 in Combination with a Variety of Novel Anticancer Agents.” American Society of Hematology Conference. Orlando, FL. December 2001. [Oral Presentation by Dr. LaRosee.]






# Moseson Dec

Final Audit Report

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